

REMARKS

Claim Rejections

Claims 1-16 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Suyama (US-6,492,723) in view of Linden et al. (US-6,201,701).

Amendments to Specification

Applicant has amended the specification as noted above to cure typographical errors. No "new matter" has been added to the original disclosure by the foregoing amendments to the specification.

Drawings

It is noted that no Patent Drawing Review (Form PTO-948) was received with the outstanding Office Action. Thus, Applicant must assume that the drawings are acceptable as filed.

New Claims

By this Amendment, Applicant has canceled claims 1-16 and has added new claims 17-27 to this application. It is believed that the new claims specifically set forth each element of Applicant's invention in full compliance with 35 U.S.C. § 112, and define subject matter that is patentably distinguishable over the cited prior art, taken individually or in combination.

The new claims recite a semiconductor build-up package having a die (210), a metal carrier (220), a plurality of bonding pads (214), and a plurality of dielectric layers (231, 232, 233). The die has an active surface (211), a passive surface (212) and sides (213) between the active surface and the passive surface. The metal carrier has a cavity (221) in a top surface. The die is positioned within the cavity such that the passive surface and sides are within the cavity. The plurality of bonding pads are electrically connected to the active surface of the die. The plurality of dielectric layers are formed on the active surface of the die and the top surface of the metal carrier. Each plurality of dielectric layers has a plurality of conductive columns (241) electrically connected to the bonding pads of the die and a plurality

of conductive traces electrically connecting corresponding conductive columns of one plurality of dielectric layers to another plurality of dielectric layers. The plurality of dielectric layers are made from a dielectric material selected from the group consisting of polyimide, epoxy, BT resin, FR-4 resin, FR-5 resin, benzocyclobutene (BCB), and polytetrafluoroethylene (PTFE).

The cited reference to Suyama recites a multichip module having a substrate (1) made of alumina ceramics, LSI chips (2) and input/output pins (6). Cavities (3) are used for mounting LSI chips which have a plurality of electrode terminals on an upper surface. A thin-film wiring layer (5) is formed on the substrate (1) and LSI chip (2). The thin-film wiring layer includes insulating layers and wire layers.

The cited reference to Linden et al. recites an integrated substrate with enhanced thermal characteristics. The device includes an aluminum base (22) which is bonded to a multilayer circuit board (24), and power semiconductor element (38) which is mounted in cavity (40). Linden et al. teaches, at col. 7, lines 24 et seq., that the:

... power semiconductor element 38 is mounted in cavity 40, which cavity is formed partially or fully into multilayer circuit board 24.

The present invention is clearly distinguishable from the cited reference to Suyama. As noted by the Examiner, on page 3, first paragraph of the outstanding Office Action, Suyama does not disclose a carrier made of metal. Applicant further submits that Suyama does not disclose a metal carrier with a cavity as in the present invention. As noted by the Examiner, page 3, paragraph three, Suyama does not disclose the dielectric layers being made of polyimide, epoxy or PTFE. Further, Applicant submits that Suyama does not teach dielectric layers formed from BT resin, FR-4 resin, FR-5 resin, or BCB. Additionally, in Suyama, the wiring electrodes (56b) that are part of the metal layer (56m) are not the same as the conductive columns of the present invention.

The present invention is clearly distinguishable from Linden et al. Linden et al. teaches an aluminum heat sink, but unlike the present invention, does not teach a metal carrier having a cavity. Further, in Linden et al. the semiconductor element is mounted in a cavity formed by the multilayer circuit board which is

mounted to the aluminum base by a bonding material, whereas in the present invention the die is connected within the cavity of the metal carrier. Further, Linden et al. does not teach a plurality of dielectric layers being made from a dielectric material selected from the group consisting of polyimide, epoxy, BT resin, FR-4 resin, FR-5 resin, BCB, and PTFE. Additionally, Linden does not teach a heat sink being adjacent to the passive surface and sides of the die to improve thermal dissipation as does the present invention.

Even if the teachings of Linden et al. and Suyama were combined, as suggested by the Examiner, the resultant combination does not suggest a metal carrier having a cavity. Further, the combination does not teach a plurality of dielectric layers being made from dielectric material selected from the group consisting of polyimide, epoxy, BT resin, FR-4 resin, FR-5 resin, BCB, and PTFE. Thus, it is submitted that neither Suyama nor Linden et al. disclose the structure set forth in Applicant's new claims 17-27. Absent the showing of this structure in either reference, Applicant submits that no combination of these references could possibly render obvious Applicant's new claims 17-27.

It is a basic principle of the United States Patent Laws that it is improper to arbitrarily pick and choose prior art patents and combine selected portions of the selected patents on the basis of the applicant's disclosure to create a hypothetical or fictional combination which allegedly renders a claim obvious unless there is some direction in the selected prior art patents to combine the selected teachings in a matter to negate the patentability of the claimed subject matter.

The Courts have advocated that even if the prior art may be modified, the modification is not obvious unless the prior art suggests the desirability for the modification. For example, in *In re Fritch*, 922 F.2d 1260, 23 USPQ.2d 1780 (Fed. Cir. 1992), the Court held, at page 1783:

The mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification.

Neither Suyama, nor Linden et al. suggest the modification that would yield the invention claimed in this application. Applicant hereby respectfully submits that no combination of the cited prior art renders obvious the new claims 17-27.

Summary

In view of the foregoing amendments and remarks, Applicant submits that this application is now in condition for allowance and such action is respectfully requested. Should any points remain in issue, which the Examiner feels could best be resolved by either a personal or a telephone interview, it is urged that Applicant's local attorney be contacted at the exchange listed below.

Respectfully submitted,

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